Phase 5: Regulatory Action Selection

Final Project Report

Total Maximum Daily Load for Nutrients in Chorro Creek, San Luis Obispo County, California

DRAFT

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1. INTRODUCTION

Chorro Creek was included on California's section 303(d) list of impaired waters for nutrients. The Clean Water Act requires a Total Maximum Daily Load (TMDL) be developed to restore impaired waterbodies to their full beneficial uses. This report addresses the nitrate portion of the nutrient impairment in the Chorro Creek watershed and discusses follow-up monitoring to address the remaining impairment to ensure that beneficial uses are protected. This section presents background information on the creek's 303(d) listing, describes the watershed and summarizes this report's outline and content.

1.1. Structure of Document

The following sections are included in this TMDL report:

- Project Definition: Identifies the 303(d) listing for Chorro Creek and summarizes available information to characterize impairments.
- Water Quality Standards: Identifies the water quality standards applicable to the listing.
- Data Review: Provides an inventory and analysis of available water quality data.
- Nitrate Source Analysis: Identifies potential sources of nitrates in the watershed.
- Nitrate TMDL: Identifies the nitrate TMDL for Chorro Creek, including allocations and considerations of seasonality and margin of safety.
- Monitoring: Discusses follow-up monitoring to track water quality improvements from the nitrate TMDL and to further characterize algal-related and dissolved oxygen impairments in the Chorro Creek watershed.
- Implementation: Discusses potential implementation activities for the nitrate TMDL, including control activities, plans for tracking the progress of implementation and the timeline for implementation activities.

1.2. Project Definition

Chorro Creek was identified as impaired for nutrients in 1998 and is included on the 2002 303(d) list. The listing does not specify whether it was based on violation of the narrative objective for biostimulatory substances, for violations of objectives for particular nutrients, or a combination.

Algal growth has been observed in the Chorro Creek watershed; however, documentation between 1993 and 2004 is limited and definitive conclusions regarding use support cannot be drawn. Nitrate data has been collected in the Chorro Creek watershed as part of the California Men's Colony (CMC) National Pollutant Discharge Elimination System (NPDES) Monitoring and Reporting Program requirements, Morro Bay National Monitoring Program (NMP) and the Morro Bay Volunteer Monitoring Program (VMP). Chorro Creek experiences violations of the nitrate water quality objective for the municipal and domestic water supply (MUN) use of 10 mg/L, particularly when the creek is effluent-dominated. Other nutrient data, such as phosphate, have been collected but neither show exceedances of a standard or no standard exists

with which to compare. Review of available dissolved oxygen data indicate that water quality objectives (WQOs) are periodically exceeded in the lower reaches of Chorro Creek.

To further characterize the impairments in the creek and identify potential causes, data analyses were conducted to examine relationships between nutrient levels, dissolved oxygen, and algal growth. An additional data analysis objective was to evaluate potential targets that represent "nuisance" concentration, such as density or extent of algal growth that exceeds the narrative objective (i.e., growths that cause nuisance or adversely affect beneficial uses).

Examination of the historic data set was inconclusive:

- Several data components (canopy) are missing
- Data coverage is insufficient to derive an explicit linkage between nutrient loading and other environmental conditions (e.g., canopy)
- There is no consistent measure of algal density or extent; available information is primarily qualitative
- Multiple factors (not all measured) are contributing to algal productivity including stream canopy, temperature, phosphorus, flow, and decreased stream velocities (in lower creek).

The conclusions that can be drawn from available data include:

- Although Chorro Creek is not listed specifically for nitrates, available water quality data show that Chorro Creek experiences violations of the nitrate WQO for the municipal and domestic water supply (MUN) use of 10 mg/L. Stations downstream of the CMC wastewater treatment plant exhibited violations of the MUN nitrate WQO and effluent concentrations are consistently greater than the MUN nitrate WQO. This supports the conclusion that the MUN drinking water supply beneficial use is impaired, or threatened in Chorro Creek, particularly when the creek is effluent-dominated.
- Because nitrate exceedances have not occurred upstream of the CMC wastewater treatment plant and limited exceedances have occurred in tributaries to Chorro Creek, the waterbody segments upstream of the CMC wastewater treatment plant and tributaries are not considered impaired for nitrates.
- The lower portion of Chorro Creek experiences dissolved oxygen water quality objective (WQO) violations.
- Algae is present, but data collected throughout Chorro Creek are primarily anecdotal and do not provide consistent documentation on severity and extent of coverage. Insufficient data are available to determine if and when algae has sufficient density to be perceived as a nuisance and clearly impacting uses in Chorro Creek, or to identify an appropriate algal target representing use support.
- Although nutrients are elevated and likely to contribute to algal growth, other factors are also contributing to the frequency and severity of algal blooms have we actually seen a "bloom"

Based on the review of available information the TMDL approach is as follows:

1. Develop a nitrate TMDL for Chorro Creek to address the exceedences of the current numeric water quality objectives.
2. Design and implement a systematic program to further assess the relationship between flow, velocity, sunlight, nutrients, algal growth and dissolved oxygen. If warranted, a subsequent TMDL will be developed to address algal associated dissolved oxygen impairments. This future TMDL could result in further nutrient (total nitrogen, nitrate, or total phosphorus) reductions as well as other practices such as riparian corridor restoration.
3. Approve modifications to the existing the California Men's Colony (CMC) permit in 2006 and set effluent limits, in addition to the receiving water limit, designed to achieve the goal of attaining 10 mg/l-N in the creek during all seasons, as the mechanism to establish the Chorro Creek Nutrient TMDL and eliminate the nitrate impairment.

The TMDL will be revisited after further monitoring and the TMDL will be revised to include targets and allocations to address the biostimulatory water quality objective and dissolved oxygen, if necessary, or to justify delisting Chorro Creek for nutrients.

1.3. Watershed Description

Chorro Creek is located in San Luis Obispo County on the central coast of California. The watershed is in a Mediterranean climate, with warm dry summers and cool wet winters. The geology of the watershed is a mix of igneous, metamorphic and sedimentary rock less than 200 million years old. Average temperature is about 12°C (54°F). Average annual rainfall ranges from 45 cm (18 inches) at the coast to 89 cm (35 inches) on the ridge; most of this rainfall occurs between November and April (sources: Department of Water Resources, 1958; Ernstrom, 1984).

Chorro Creek drains to the Morro Bay estuary (Figure 1). As shown in Figure 1, the CMC wastewater treatment plant drains to Chorro Creek downstream of the confluence with Pennington Creek (PEN).

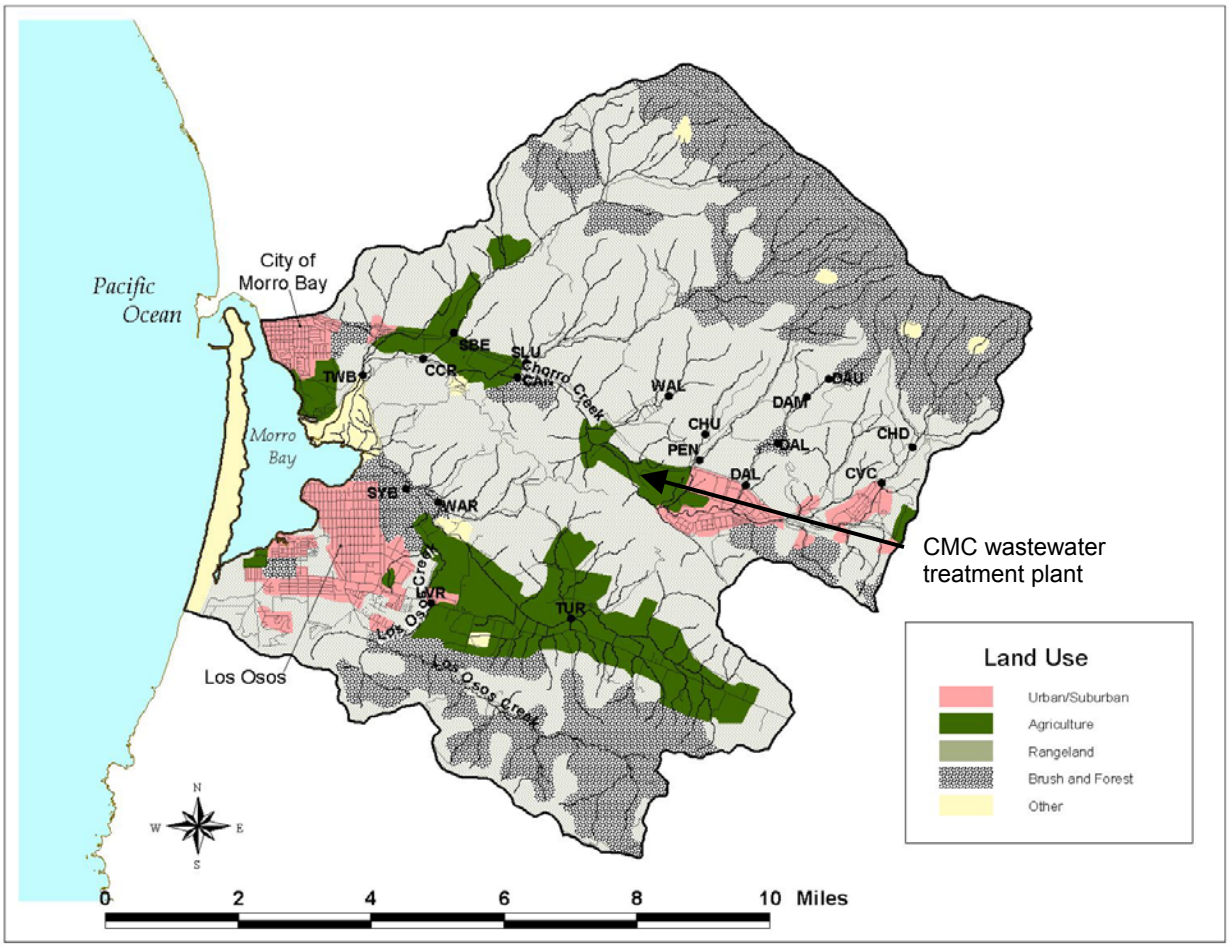

Figure 1. Waterbodies, land uses, and monitoring sites within the Chorro Creek watershed.

The Chorro Creek watershed is dominated by rangeland with areas of woodland, cropland, and urban land use. Table 1 summarizes the land use in the Chorro watershed.

Table 1. Land use categories within the Chorro Creek watershed (acres/% total)

Brushland	Woodland	Rangeland	Cropland	Urban	Total
4,796	2,440	17,715	1,715	1,528	28,193
17.0%	8.7%	62.8%	6.1%	5.4%	

Source: based on UC Santa Barbara GAP data and CDF Wildlife Habitat Relationships, 1998.

2. WATER QUALITY STANDARDS

Regional Water Quality Control Boards (Regional Boards) define beneficial uses for waterbodies in their Water Quality Control Plans (Basin Plans). Also included in the Basin Plan are numeric and narrative objectives to protect the beneficial uses in each waterbody. The following sections discuss the applicable beneficial uses and water quality objectives related to the 303(d) listing for nutrients in Chorro Creek.

2.1. Beneficial Uses

Chorro Creek, along with several tributaries to Chorro Creek, have designated beneficial uses in the Basin Plan. Table 2 summarizes the designated beneficial uses for Chorro, Dairy, San Luisito, and San Bernardo Creeks. The Basin Plan states that surface waterbodies within the region that do not have beneficial uses designated for them, such as Pennington, Chumash, and Walters Creeks[1], are assigned the beneficial uses of "municipal and domestic water supply" and "protection of both recreation and aquatic life." Staff interprets this general statement of beneficial uses to encompass the four Beneficial Uses shown in Table 2 for these tributaries.

Table 2. Beneficial uses for Chorro Creek and tributaries to Chorro Creek.

Waterbody	Chorro Creek	Dairy, San Luisito, and San Bernardo Creeks	Pennington, Chumash, and Walters Creeks[1]
Municipal and Domestic Supply (MUN).	X	X	X
Agricultural Supply (AGR)	X	X	
Industrial Process Supply (PROC)			
Industrial Service Supply (IND)			
Ground Water Recharge (GWR)	X	X	
Water Contact Recreation (REC-1)	X	X	X
Non-Contact Water Recreation (REC-2)	X	X	X
Wildlife Habitat (WILD)	X	X	
Cold Fresh Water Habitat (COLD)	X	X	
Warm Fresh Water Habitat (WARM)	X		X
Migration of Aquatic Organisms (MIGR)	X	X	
Spawning, Reproduction, and/or Early Development (SPWN)	X	X	
Preservation of Biological Habitats of Special Significance (BIOL)	X		
Rare, Threatened, or Endangered Species (RARE)	X	X	
Estuarine Habitat (EST)			
Freshwater Replenishment (FRSH)	X		
Navigation (NAV)			
Hydropower Generation (POW)			
Commercial and Sport Fishing (COMM)	X	X	

Aquaculture (AQUA)			
Inland Saline Water Habitat (SAL)			
Shellfish Harvesting (SHELL)			

[1] These tributaries are not specifically listed in the Basin Plan; therefore, two general uses (encompassing four Beneficial Uses) designated for all waterbodies in the Region apply: Municipal and Domestic Water Supply (MUN) and protection of both recreation and aquatic life (REC-1 REC-2, WARM).

2.2. Water Quality Objectives

Water quality objectives applicable to the 303(d) listing include the following:

- numeric objectives for the specifically designated beneficial uses in Chorro, Dairy, San Luisito, and San Bernardo Creeks;
- the numeric objective for nitrate protective of the MUN beneficial use and the general numeric objective for dissolved oxygen applicable to Pennington, Chumash, and Walters Creeks; and
- the general narrative objective for biostimulatory substances applicable to Chorro Creek and all of its tributaries.

Numeric objectives for dissolved oxygen and nitrate are listed in Table 3.

Table 3. Water quality objectives for dissolved oxygen and nitrate

Beneficial Use	Dissolved Oxygen Objective	Nitrate Objective
General	median values should not fall below 85 percent saturation as a result of controllable water quality conditions.	
MUN	N/A	Maximum of 45 mg/l as NO_3[1]
AGR	Minimum of 2 mg/L	
COLD	Minimum of 7 mg/L	
WARM	Minimum of 5 mg/L	
SPWN	Minimum of 7 mg/L	

[1]Equivalent to 10 mg/l as N

The general narrative objective for biostimulatory substances states:

> *Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.*

3. DATA REVIEW

This section summarizes the data collected as part of the California Men's Colony (CMC) National Pollutant Discharge Elimination System (NPDES) Monitoring and Reporting Program requirements, Morro Bay National Monitoring Program (NMP) and the Morro Bay Volunteer

Monitoring Program (VMP). Data include nutrient and dissolved oxygen concentrations and anecdotal information on algal growth in Chorro Creek and it's tributaries.

3.1. Nitrate

Staff evaluated effluent nitrate data collected by CMC personnel as part of their National Pollutant Discharge Elimination System (NPDES) permit relative to the municipal drinking water (MUN) nitrate objective of 10 mg/l-N. Figure 1 shows the location of the CMC wastewater treatment plant discharge to Chorro Creek. Table 4 shows average monthly nitrate concentrations in CMC effluent. Concentrations in effluent discharged to the creek were consistently greater than 10 mg/l-N during the study period.

Staff also evaluated receiving water nitrate data collected by the CMC relative to the MUN nitrate objective. The monitoring locations are as follows: immediately downstream of Chorro Reservoir, 100 feet upstream of the CMC discharge point, 100 feet downstream of the CMC discharge point, and 0.6 miles downstream of the CMC discharge point. Exceedance of the MUN nitrate objective in the receiving waters of Chorro Creek occurred 100 feet downstream of the discharge three times in 1997. No exceedances occurred in the creek from 1998-2001. Available data was collected during periods when there was natural flow in the creek. Because data is not available during drought years, staff thinks any recurring impairment is most likely to occur under effluent-dominated conditions when there is no dilution of the effluent from waters upstream of the CMC discharge.

Therefore, staff assumes that the instream nitrate levels will exceed the MUN objective when upstream flows do not dilute the effluent discharged. Staff considers this as evidence that the MUN beneficial use in Chorro Creek is threatened, or impaired during drought conditions, when the creek is effluent-dominated.

Table 4. Average monthly nitrate concentrations of CMC effluent, 1997-2001.

	NO_3-N (mg/l)
January	12.2
February	10.5
March	6.7
April	9.6
May	17.7
June	14.6
July	10.0
August	12.0
September	13.3
October	13.3
November	12.7
December	17.0

Source: CMC Annual Summary Reports

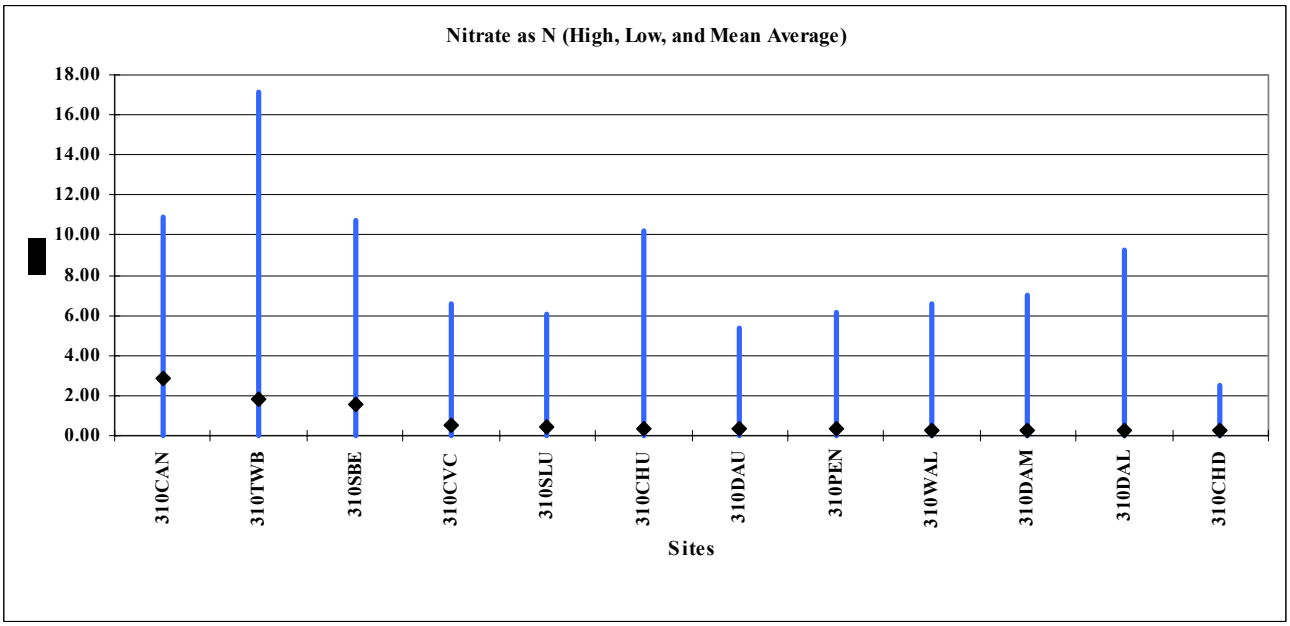

Figure 2. Nitrate levels in Chorro Creek.

Figure 2 shows the observed nitrate concentrations at stations on Chorro Creek. The data indicate that levels at CAN, downstream of the CMC wastewater treatment plant (at CAN and TWB) are the highest in the watershed. One exceedance occurred at SBE in the winter of 95/96, but levels were typically lower than those found on Chorro Creek at CAN and TWB.

Data support the conclusion that the MUN use is impaired in the reaches downstream of the wastewater treatment plant on Chorro Creek. Because very few exceedances have occurred in the upstream reaches of Chorro Creek and all tributaries to Chorro Creek, these waterbodies are not considered impaired by nitrates.

3.2. Phosphate

Phosphate data has been collected in the Chorro Creek watershed. Figure 3 shows the observed phosphate concentrations at stations on Chorro Creek. Phosphate concentrations are higher at CAN and TWB than other locations throughout the Chorro Creek watershed; although there is no WQO with which to compare the data.

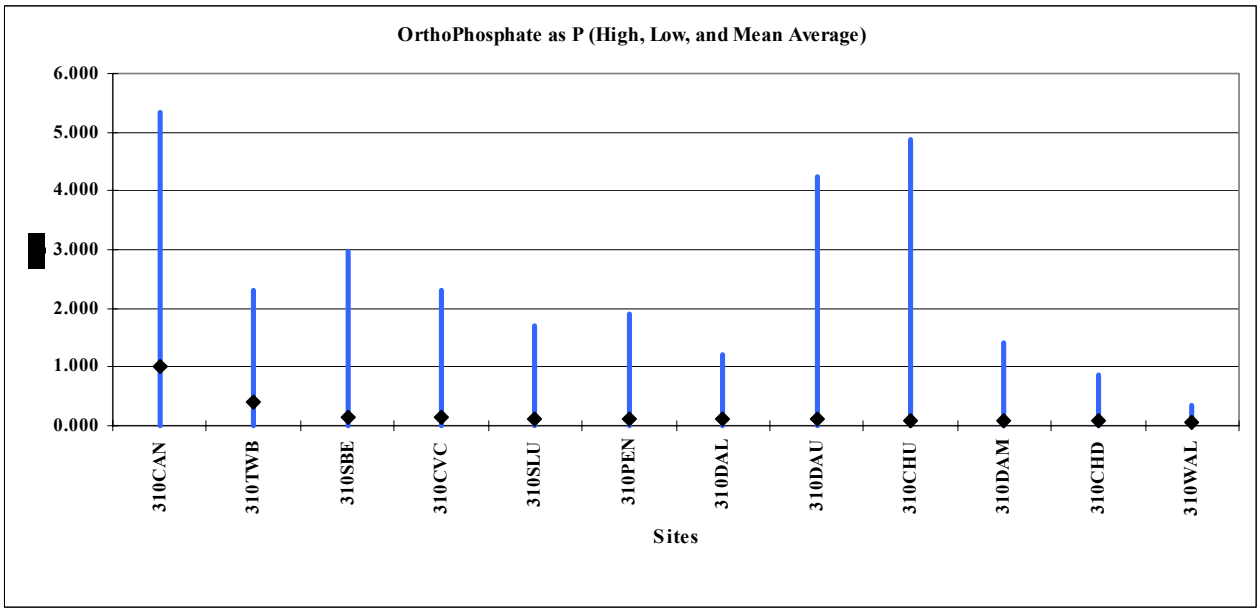

Figure 3. Phosphate levels in Chorro Creek.

3.3. Dissolved Oxygen

Figures 4 and 5 show dissolved oxygen and percent saturation levels at sites in the Chorro Creek watershed. Dissolved oxygen concentrations fell below the applicable WQOs at numerous sites within the watershed. Median percent saturation levels were within the WQO with the exception of DAM.

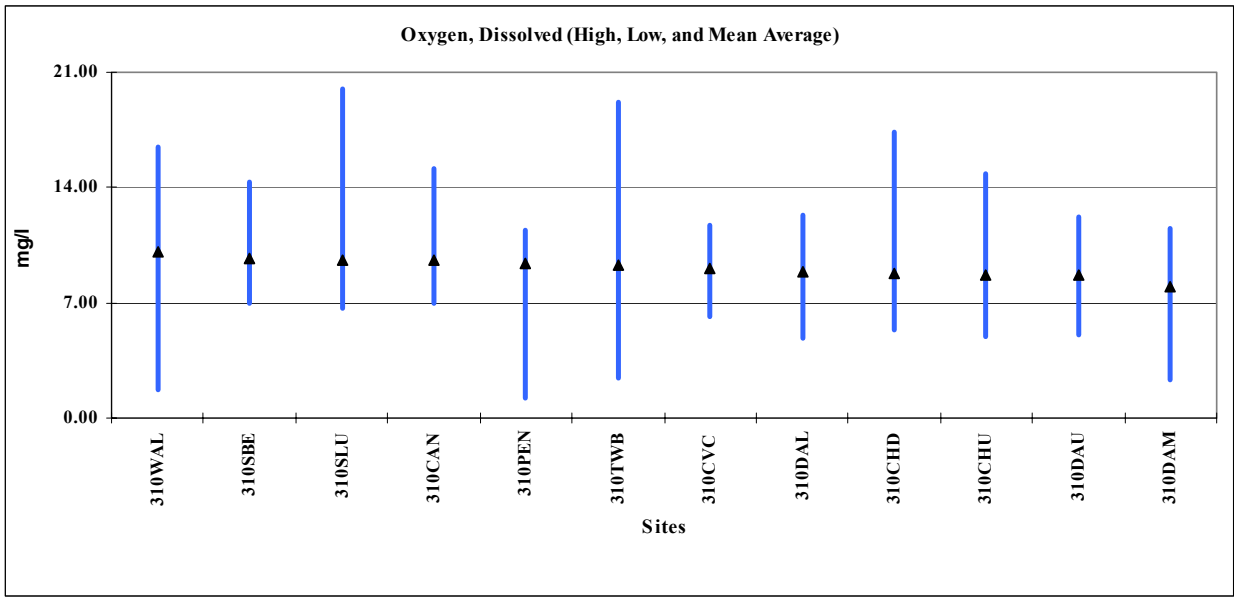

Figure 4. Dissolved oxygen levels in Chorro Creek

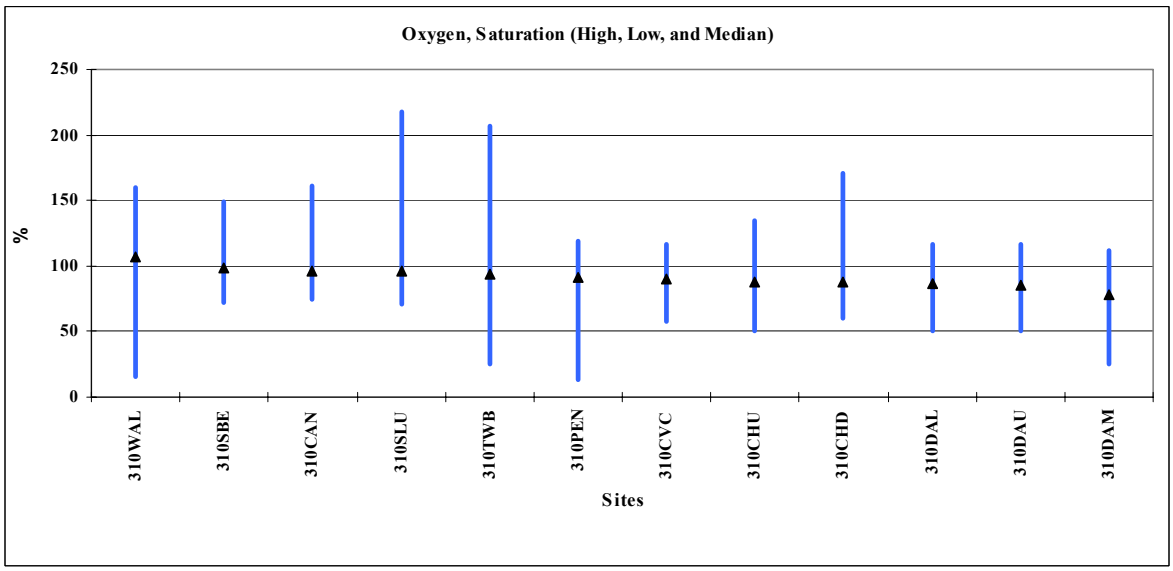

Figure 5. Percent saturation levels in Chorro Creek.

Staff evaluated dissolved oxygen concentrations collected at 24-hour intervals on a monthly basis between August and October 2003. Dissolved oxygen concentrations and percent saturation levels fell below water quality objectives at two lower reaches of Chorro Creek (TWB and CCR). Figure 6 shows diurnal fluctuations of dissolved oxygen in October 2003. As shown, dissolved oxygen levels fell below the COLD freshwater numeric objective of 7.0 mg/l during pre-dawn hours at both downstream sites, particularly at TWB. The monitoring site, CHO, is upstream of the CMC discharge and CAN is located 0.5 miles downstream of the discharge.

Neither of these sites experienced the diurnal fluctuations that were measured further downstream.

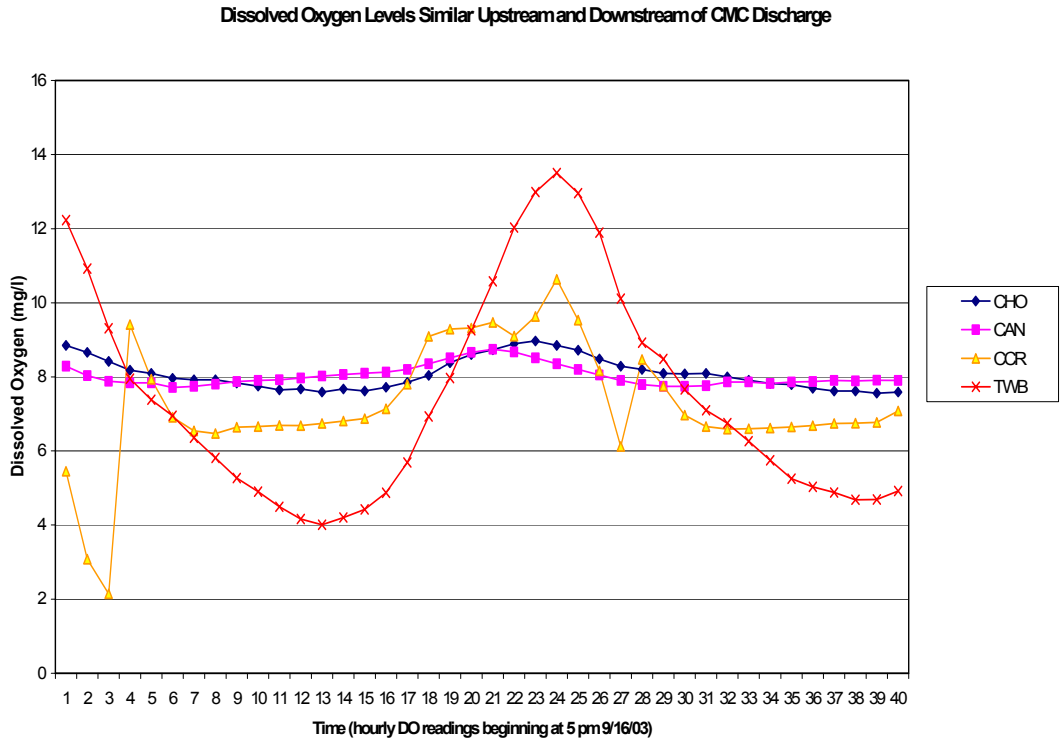

Figure 6. 24-hour dissolved oxygen levels at four locations on Chorro Creek.

Low dissolved oxygen (along with algal growths, discussed below) may be impacted by nutrient loading to the streams, but is expected to be primarily influenced by canopy and shading, temperature, and other environmental conditions; however, sufficient and consistent data are not available to evaluate the direct causes. In particular, the available data on algal extent and frequency are qualitative and cannot be used to correlate with potential sources or causes.

3.4. Algal Growth

As part of the NMP and VMP, algal growth was been documented during multiple field visits throughout Chorro Creek (at CVC, PEN, CAN, and TWB) in 2003 and 2004. Information suggests a marked difference in algae depending on canopy cover. Algal data are anecdotal, however, and do not provide consistent documentation on severity and extent of coverage and effect on use, making it difficult to clearly identify the impact of algal growth on uses in Chorro Creek or to identify an appropriate algal target representing use support.

Staff have also evaluated algal cover directly upstream and downstream of the CMC wastewater treatment plant. As shown in Figure 7, algal cover variability is similar upstream and downstream of the CMC discharge. Staff observed that algal growth occurred where there was less canopy cover both upstream and downstream of the discharge.

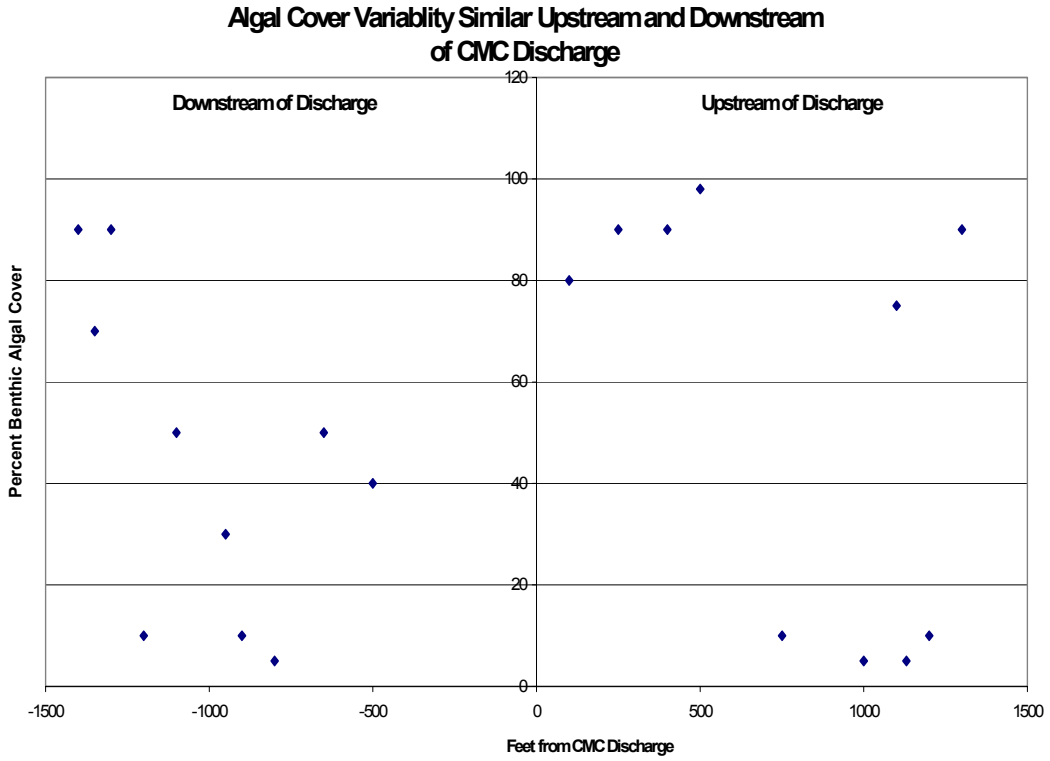

Figure 7. Algal cover upstream and downstream of the CMC discharge.

Although nutrients are elevated and likely to contribute to algal growth, other factors (e.g., canopy cover) are also contributing to the frequency and severity of algal blooms. Information suggests that nutrients alone are not causing algal growth, and growth may be more a function of other factors than of nutrient levels.

Information documents the presence of algal growth, but does not demonstrate violation of the biostimulatory objective (which prohibits concentrations that "promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses"). However, data are also not sufficient enough to confirm use support. Further information collected using a consistent methodology of quantitatively evaluating or scoring the creek's algal conditions is necessary to evaluate the algal growth, frequency, and impacts.

3.5. Data Summary

Data indicate that the MUN beneficial use is not protected in Chorro Creek downstream of the CMC wastewater treatment plant discharge, particularly when upstream flows do not dilute the effluent discharged. Phosphate concentrations are also higher downstream of the CMC wastewater treatment plant than at other locations throughout the Chorro Creek watershed; although there is no WQO with which to compare the data.

Dissolved oxygen levels do not meet WQOs at locations in Chorro Creek. Algal growth has been documented but documentation is not sufficient to determine the extent and severity of the

algae and whether it impacts designated uses. Data analyses are inconclusive in establishing a relationship between nutrients, dissolved oxygen and algal growth. While algae and corresponding low dissolved oxygen are likely exacerbated by nutrient loading, they are likely driven by canopy conditions and other environmental conditions.

Further monitoring will be conducted to evaluate the dissolved oxygen and algal conditions in the creeks and to identify causes or sources of the impairments and appropriate targets that will support uses. TMDLs to address dissolved oxygen and algae in Chorro Creek will be written, if necessary, when the additional data are collected. Because data suggest an impairment by nitrates, a TMDL will be developed for nitrates in the lower reaches of Chorro Creek.

4. NITRATE SOURCE ANALYSIS

Figure 1 shows the location of the CMC wastewater treatment plant, along with land uses in the Chorro Creek watershed. As discussed previously, Chorro Creek only experiences violations of the nitrate water quality objective protective of the MUN beneficial use downstream of the CMC wastewater treatment plant. As such, staff concludes the only significant source of nitrate causing exceedances of the MUN nitrate objective in Chorro Creek is the discharge from the CMC wastewater treatment plant. Therefore, nonpoint soures (rangeland, or cropland) are not treated as sources in this TMDL analysis.

5. NITRATE TMDL

The TMDL represents the loading capacity of a waterbody—the amount of a pollutant that the waterbody can assimilate and still support beneficial uses. The TMDL is the sum of allocations for nonpoint and point sources and any allocations for a margin of safety. TMDLs are often expressed as a mass load of the pollutant but can also be expressed as a unit of concentration (40 CFR 130.2(i)).

The nitrate TMDL for Chorro Creek is set at a maximum concentration for nitrate of 10 mg/l-N in receiving water to protect the MUN beneficial use. The CMC is given a wasteload allocation equal to the numeric target (10 mg/l-N). As such, monthly effluent concentrations must achieve the goal of maintaining 10 mg/l-N in the creek during all seasons. Cropland and rangeland are given an allocation equal to their existing load, and as such, there are no additional requirements for cropland and rangeland landowners or operators. The allocations, which include background levels, are also equal to the numeric target.

A direct linkage between the loading capacity and the numeric target exists in that the TMDL, allocations, and numeric target value are the same. Expressing the TMDL as a nitrate concentration equal to the WQO provides a direct measure of the nitrate levels in the watershed to compare with water quality objectives and provides a measurable target for the source to monitor and with which to comply. Requiring the responsible party for nitrate loading to reduce

nitrate discharges to the numeric target of 10 mg/l-N establishes a direct link between the TMDL target and sources.

Seasonality is not a determining factor in the TMDL because the TMDL is equal to the MUN nitrate WQO, which must be met at all times. Exceedance of the MUN nitrate WQO in the receiving waters of Chorro Creek is a function of dilution of the effluent from waters upstream of the CMC discharge. Because effluent concentrations greater than 10 mg/l occur year-round, discharges during drought conditions when the creek is effluent-dominated, would result in instream exceedances of the MUN nitrate WQO. As such, the numeric target concentration is established for the discharge at all times.

The margin of safety for this TMDL is implicitly included through the use of the MUN nitrate WQO as the TMDL. The WQO was established using conservative assumptions, translating to an implicit margin of safety.

6. MONITORING

This section discusses the planned and recommended monitoring in the Chorro Creek watershed. Monitoring will include continued water quality monitoring to measure the progress of the creeks in meeting the nitrate TMDL target and also additional studies and monitoring to further evaluate the unconfirmed algal growth impairment.

6.1. Follow-up Monitoring for Nitrate TMDL

Monitoring for nitrate by the CMC, as required according to the Monitoring and Reporting Program set forth in the NPDES permit, will provide the primary information needed to evaluate progress towards achieving the TMDL. Monitoring will also be performed by the VMP in Chorro Creek (at CAN and TWB) to ensure that the numeric target is met. The Regional Board will provide quality assurance support to the VMP by means of 15 percent duplicate laboratory sample analysis as resources allow. Additionally, monitoring for nitrate by landowners, as required according to the Monitoring and Reporting Program set forth in the Conditional Waivers of Waste Discharge Requirements for Discharges from Irrigated Lands in the Central Coast Region (conditional waivers), will provide information for this TMDL. Regional Board staff will review data after two years to determine achievement of the TMDL. If the executive officer determines additional monitoring is needed, he shall request it pursuant to Section 13267 of the California Water Code.

6.2. Additional Monitoring to Characterize Algal Growth and Dissolved Oxygen

In addition to monitoring conducted to evaluate nitrate concentrations in Chorro Creek, the Regional Board will conduct further monitoring to investigate and obtain information to determine causes of algal blooms and dissolved oxygen conditions that may be causing impairments (flow, DO, temperature, total nitrogen, total phosphorous, nitrate, phosphate, algal

biomass, chlorophyll, benthics). Regional Board staff will develop a monitoring plan to address the remaining impairment to ensure that beneficial uses are protected in conjunction with the *Los Osos Creek, Warden Creek, and Warden Lake Wetland Nutrient TMDL* review.

The additional monitoring throughout the Chorro Creek watershed is necessary to confirm and further characterize potential impairments in Chorro Creek by algal growth and low dissolved oxygen. Monitoring will be designed to answer the following key questions:

- What is the frequency and duration of the occurrence of algal growth? (i.e., Is algal growth persistent?)
- What is the extent of the algal growth (e.g., spatial distribution)?
- Does algal growth impair uses (e.g., visual/aesthetic, aquatic life, recreation)?
- What are contributing factors to algal growth and low dissolved oxygen? What are the shade, temperature, and flow conditions during times of impairment and attainment?

A key element of the additional monitoring will be consistent and quantifiable documentation of algal growth and corresponding conditions in the creeks. It is important to document algae using a consistent methodology and to quantify, to the extent possible, the severity and coverage of the algae growth. Corresponding water quality (e.g., dissolved oxygen, nutrients, etc.) and physical data (e.g., shading conditions, temperature, flow, etc.) should be collected at times of algal documentation to build a database of environmental conditions during times of algal growth and also clear conditions. In addition, periodic biological monitoring should be conducted to assess use support. The combination of consistent chemical and physical data supported by biological data will facilitate the determination of whether there are impairments from algae and low dissolved oxygen, their impact on uses and potential causes.

Recommended procedures and documents to be used for documenting (written and photographic) algal growth and related indicators (e.g., water color, fish behavior, etc.) will be developed.

In addition, Regional Board staff are involved in a state-wide effort to establish protocols for determining causes of algal blooms and dissolved oxygen conditions that may be causing impairments, and proposing control options, where reduction of nutrient loading alone is unlikely to generate a response in the waterbody.

Staff will implement the monitoring plan and collect data for three years; staff believes this period of data collection will be sufficient to make a definitive assessment of whether there are exceedances of the narrative biostimulatory objective in the Chorro Creek watershed. Regional Board staff will determine whether these studies result in improved information by which to evaluate whether there are exceedances of the narrative biostimulatory objective and, if so, to set numeric targets for such impairment.

Regional Board staff will review the continuing and expanded monitoring results every three years. Staff will also review the TMDL to determine if revisions are necessary. Regional Board staff will present to the Regional Board for approval any necessary revisions of this TMDL (problem statement, numeric targets, implementation plan, etc.), or, if appropriate, a separate

TMDL for overall nutrient or biostimulatory substance impairment to address the algal growth and corresponding low dissolved oxygen. However, if protection of beneficial uses is demonstrated (i.e., the data do not show exceedances of the biostimulatory objective and the nitrate objectives are attained) then Regional Board staff will propose de-listing of the waterbody for nutrient impairments.

7. IMPLEMENTATION

The primary source of nitrates to Chorro Creek is the wastewater treatment plant primarily servicing CMC and other indirect dischargers and local sewering entities. As such, implementation of the TMDL relies on future modifications to the requirements in the CMC's existing National Pollutant Discharge Elimination System (NPDES) permit.

Included in CMC's existing permit is a receiving water limitation of 45 mg/l-NO_3, or 10 mg/l-N. The Regional Board adopted a Cleanup or Abatement Order (CAO) on September 15, 1998 requiring the CMC to upgrade the treatment plant by December 01, 2001. Predicted effluent nitrate concentrations range between 2.1 mg/l-N and 3.9 mg/l-N, well below the MUN drinking water objective for nitrate of 10 mg/l-N. Completion of the upgrade is planned for January 2006. As such, Regional Board staff plans to modify CMC's NPDES permit in 2006 and set effluent limits, in addition to the receiving water limit, designed to achieve the goal of attaining 10 mg/l-N in the creek during all seasons. The revised permit will include elements of the TMDL (wasteload allocation and Margin of Safety). The TMDL will be achieved after new requirements are met.

In addition to implementation required as part of the TMDL pursuant to the CMC NPDES permit, cropland landowners will implement management measures pursuant to the Conditional Waivers of Waste Discharge Requirements for Discharges from Irrigated Lands in the Central Coast Region (conditional waivers) and rangeland landowners will continue to implement management measures on a voluntary basis to maintain their existing loads.

7.1. Measuring Progress

Regional Board staff will conduct a review at the end of two years to evaluate implementation efforts to address the nitrate impairment, and will review additional information related to possible biostimulatory substance impairment every three years in conjunction with the *Los Osos Creek, Warden Creek, and Warden Lake Wetland Nutrient TMDL* evaluation. Regional Board staff will utilize information submitted pursuant to the NPDES permit (CMC Annual Reports), along with other relevant information (data collected pursuant to the conditional waivers and the VMP).

Regional Board staff may conclude and articulate in the reviews that ongoing implementation efforts may be insufficient to ultimately achieve the allocations and numeric target. If this occurs, Regional Board staff will recommend revisions to the implementation plan. Regional Board staff may conclude and articulate in the review that to date, implementation efforts and

results are likely to result in achieving the allocations and numeric target, in which case existing and anticipated implementation efforts should continue. If allocations and numeric targets are being met, Regional Board staff will recommend the waterbody be removed from the 303(d) list.

7.2. Timeframe

Regional Board staff proposes a two-year timeframe to achieve the TMDL. The timeframe for TMDL completion is based primarily on the expectation that the upgrade will be completed by 2006. Regional Board staff believes two years is a reasonable timeframe to upgrade the wastewater treatment plant and reduce nitrate levels consistent with the allocations and the numeric target.

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